CRITERION 2	Program Curriculum and Teaching – Learning Processes

● **PROGRAM CURRICULUM AND TEACHING - LEARNING PROCESSES**

○   **Programme Curriculum**

State the process used to identify extent of compliance of the University curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in Annexure I. Also mention the identified curricular gaps, if any

Jaya Sakthi Engineering College established in 2001, approval of AICTE has been affiliated to ANNA UNIVERSITY. The curriculum/ syllabus as follow:

Department of Computer science and Engineering follows a systematic process in the design and development of the curriculum as per Choice Based Credit System (CBCS), which involves high level of participation, discussion and critical inquiry involving all the stakeholders contributing to the introduction, innovation, and revision of the syllabus. The curriculum have the balance in the composition of Basic Science Courses, Engineering Science Courses, Humanities and Social Science Courses, professional Core, professional Electives, Open Elective, Employability enhancement courses, Basic Life skills and Project Work.

Program Outcomes and Program Specific Outcomes as defined by the program are listed below:-

PROGRAMME

Engineering Graduates will be able to:	
PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering Fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of Mathematics, natural sciences, and engineering sciences.
PO3	**Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental Considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and Synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and

	modern engineering and IT tools including prediction and modeling to complex Engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities Relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and Norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or Leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

	Engineering Graduates will be able to:
PSO1:	Exhibit design and programming skills to build and automate business solutions using cutting edge technologies.
PSO2:	Strong theoretical foundation leading to excellence and excitement towards research, to provide elegant solutions to complex problems.
PSO3:	Ability to work effectively with various engineering fields as a team to design, build and develop system applications.

The composition of the curriculum Regulation 2017 & 2021 for the program of B.E (Bachelor of Engineering) in Computer science and Engineering is shown in table 2.1

Table 2.1. Credit Contribution of Basic Curricular Components

SI No	Course Category	Code	Regulation 2017	Regulation 2021	Mapped PO's
	Curricular Components		**Percentage Contribution in (%)**		**Mapped PO's**
1	Humanities and Social Sciences	HS	7.60	7.40	PO-7,PO-8,PO-12
2	Basic Sciences	BS	16.8	15.43	PO-1,PO-2,PO-3, PO-4,PO-5,PO-6, PO-12
3	Engineering Sciences	ES	12.5	11.11	PO-1, PO-12
4	Professional Core	PC	44.5	37.65	PO-1, PO-2, PO- 3, PO-4, PO-5, PO-6, PO-8, PO-9, PO-10, PO-11, PO12
5	Professional Electives	PE	8.15	11.11	PO-1, PO-2, PO- 3, PO-4, PO-5, PO-6, PO-8, PO-9, PO-10, PO-11, PO12
6	Open Electives	OE	3.3	7.40	PO-1, PO-2, PO-3 PO-8, PO-10, PO12
7	Employability Enhancement Courses	EEC	7.65	9.87	PO-1, PO-3, PO-4 PO-5, PO-8, PO-9 PO-10, PO-11, PO12

Table 2.1 depicts that the university recommended curriculum maintains the balance in the composition of various basic curricular components. However, it is necessary that the student's learning outcome should be in consonance, to the extent possible, with the current academic scenario in the relevant field of engineering and with the needs of the relevant industry.

A. Process used to identify extent of compliance of university curriculum for attaining POs & PSOs

Process Diagram to Identify Extent of Compliance of the University Curriculum for Attaining the Program Outcomes and Program Specific Outcomes

Process flow for Identification of

Fig.2.1. Process to identify gap in the syllabus

The gaps are identified using the following methods

1. Alumni Survey

2. Employer Survey

3. Student Exit Survey

4. DAC

Different surveys are conducted at different frequencies from different stakeholders of the

program. Two survey forms and samples of surveys taken are shown.

Process to identify curricular gaps for courses through surveys: Alumni Survey

- Measures the extent to which past students believes that they have achieved study results at the program level.
- Overall program satisfaction.
- Overall satisfaction with the program delivery.
- Information on current professional or academic status.

2. Employers Survey
- Provides general information on current industry trends.
- Desirable graduate attributes
- Overall perceptions of program quality
- Strengths and expectations of graduates.
- Overall satisfaction with the program delivery.

3. Students Exit Survey
- Measures quality of the program and satisfaction with curriculum.
- An overall program delivery.

4. DAC survey
- Provides general information on the quality of the program.
- Comparison of syllabus on current and previous syllabus
- Discussion about industry –institute interaction

LIST OF CURRICULAR GAPS IDENTIFIED FROM DIFFERENT SOURCES:

Table 2.2.Details of the curricular gaps and their implementation (A)

Academic year 2022-2023(odd sem)

S.No	Content Beyond syllabus	Proposed Actions
	II YEAR III SEM –Regulation 2021	
	Course Name: CS3391/ Object oriented programming	
1	AWT,SWING,GRAPHICS	Guest Lecture
	Course Name: CS3301 / Data structures	
2	Dijkstra's algorithm	Guest Lecture
	Course Name: CS3352 / Foundations of data science	
3	Data analytics	Seminar
	III YEAR V SEM - Regulation 2017	
S.No	Content Beyond syllabus	Proposed Actions
	CourseName: CS8591/ Computer networks	
1	Implementation/simulation of protocols	Lab session
	Course Name: CS8501 /Theory of computation	
2	Recursive language	Guest Lecture
	Course Name: CS8592 /Object oriented analysis and design	
3	Familiarization of eclipse	Demo
	Course Name: OCE551/Air Pollution and Control Engineering	
4	Prevention of Air Pollutions	Webinar

IV YEAR VII SEM –Regulation 2017	
S.No	**Content Beyond syllabus**	**Proposed Actions**
CourseName: CS8792/Cryptography and network security	
1	Blow fish	**Guest lecture**
CourseName: CS8791/Cloud computing	
2	Green cloud computing	Webinar
CourseName: OBM752/Hospital management	
3	Health management system	Guest Lecture

Academic year 2021-2022(Odd sem)

II YEAR III SEM –Regulation 2017		
S.No	**Content Beyond syllabus**	**Proposed Actions**
1	**Course Name: CS8391/ Data Structures**	
	Hashing techniques	Guest Lecture
2	**Course Name:CS8392 /Object Oriented Programming**	
	JAVAFX Programming	Guest Lecture
III YEAR V SEM - Regulation 2017		
S.No	**Content Beyond syllabus**	**Proposed Actions**
1	**CourseName:CS8591/ Computer Networks**	
	Channel allocation problem using wireless sensor network	Workshop
2	**CourseName:CS8501 /Theory of Computation**	
	Type-ii grammar missing	Webinar
3	**Course Name :CS8592/ Object Oriented Analysis and Design**	
	Pattern based applications	Guest lecture
IV YEAR VII SEM –Regulation 2017		
S.No	**Content Beyond syllabus**	**Proposed Actions**
1	**Course Name:CS8792 /Cryptography and Network Security**	
	MD-5	Webinar
2	**Course name:cs8791/Cloud computing**	
	Edge computing	Guest Lecture

Academic year 2021-2022(even sem)	
II YEAR IV SEM –Regulation 2017	

S.No	Content Beyond syllabus	Proposed Actions
1	**Course Name:** CS8491/Computer architecture	
	Parallel computing SIMD	Guest lecture
2	**Course Name:**CS8492 /Database Management Systems	
	Data warehousing	webinar
3	**Course Name:**CS8451/ Design and Analysis of Algorithms	
	Graph coloring problem	Work shop
4	**Course Name:** CS8493 /Operating Systems	
	Real world application of Linux OS	Guest Lecture
5	**Course Name:** CS8494 /Software Engineering	
	Testing tool	Guest Lecture
III YEAR VI SEM - Regulation 2017		

S.No	Content Beyond syllabus	Proposed Actions
1	**Course Name**:CS8651/ Internet Programming	
	WAMP Procedure and working Principles	Webinar
2	**Course Name:**CS8691 /Artificial Intelligence	
	Application of stochastic methodology in AI	Work shop
3	**Course Name:**CS8601 /Mobile Computing	
	5G generation	Work shop
4	**Course Name :**CS8602 /Compiler Design	
	Heap allocation in compiler	Guest lecture
5	**Course Name:**CS8603/Distributed Systems	
	Pastry	Webinar

IV YEAR VIII SEM –Regulation 2017		
S.No	**Content Beyond syllabus**	**Proposed Actions**
1	**Course Name:**CS8074 Cyber Forensics	
	Portable electronic device forensic	Webinar
2	**Course Name:**CS8078 Green Computing	
	ICT energy demand	Guest lecture

List the curricular gaps for the attainment of defined POs and PSOs

Table 2.3.Academic Year-2021-2022(odd sem)

IDENTIFICATION OF

Regulation	Semester	Code	Subject	Gap	Relevance to POs/PSOs	Source of Identifi cation
2017	03	CS8391	Data Structures	Hashing techniques	PO12/ PSO1,PSO3	Alumni Survey
2017	03	CS8392	Object Oriented Programming	JAVAFX Programming	PO12/ PSO1,PSO3	Alumni Survey
2017	05	CS8591	Computer Networks	Channel allocation problem using wireless sensor network	PO12/ PSO1,PSO3	Alumni Survey
2017	05	CS8501	Theory of Computation	Type-ii grammar missing	PO11,PO12,P SO1,PSO2,PS O3	Alumni Survey
2017	05	CS8592	Object Oriented Analysis and Design	Pattern based applications	PO12/ PSO1,PSO3	Alumni Survey
2017	07	CS8792	Cryptography and Network Security	MD-5	PO12/ PSO1,PSO3	Alumni Survey

2017	07	CS8791	Cloud computing	Edge computing	PO12/ PSO1,PSO2,PSO3	Alumni Survey

Academic Year-2021-2022 (even sem)

Regulation	Semester	Code	Subject	Gap	Relevance to POs/PSOs	Source of Identification
2017	04	CS8491	Computer architecture	Parallel computing SIMD	PO12/ PSO1,PSO3	Employer survey
2017	04	CS8492	Database Management Systems	Data warehousing	PO12/ PSO1,PSO3	Employer survey
2017	04	CS8451	Design and Analysis of Algorithms	Graph coloring problem	PO12/ PSO1,PSO2,PSO3	Employer survey
2017	04	CS8493	Operating Systems	Real world application of Linux OS	PO12/ PSO1,PSO3	Employer survey
2017	04	CS8494	Software Engineering	Testing tool	PO12/ PSO1,PSO3	Employer survey
2017	06	CS8651	Internet Programming	WAMP Procedure and working Principles	PO12/ PSO1,PSO2,PSO3	Employer survey
2017	06	CS8691	Artificial Intelligence	Application of stochastic methodology in AI	PO12/ PSO1,PSO3	Employer survey
2017	06	CS8601	Mobile Computing	5G generation	PO12/ PSO1,PSO2,PSO3	Employer survey
2017	06	CS8602	Compiler Design	Heap allocation in compiler	PO12/ PSO1,PSO3	Employer survey
2017	06	CS8603	Distributed Systems	Pastry	PO12/ PSO1,PSO2,PSO3	Employer survey
2017	08	CS8074	Cyber Forensics	Portable electronic device forensic	PO12/ PSO1,PSO3	Employer survey
2017	08	CS8078	Green Computing	ICT energy demand	PO12,PSO1, PSO2,PSO3	Employer survey

State the delivery details of the content beyond the syllabus for the attainment of POs & PSOs

- In general, content beyond the syllabus is handled by the respective faculty members for all the courses they handle, to augment the attainment of associated POs and PSOs.
- In addition, topics to comply with the POs & PSOs are conducted for specific courses by including the content beyond the syllabus is incorporated in the lesson plan.

2.1.2.A. Steps taken to get identified gaps included in the curriculum.(E.g. letter to University/BOS)

Table 2.4. Steps taken for attaining the Gaps identified

Sl. No.	Additional Cos(Gaps)	Name of the Course/Year / Sem	Date of Step Taken	Explanation	PO/ PSOs	Submitted to
1.	Inclusion of Network Security and Cryptography	Computer Networks III/V	10.09.2022	Requested to include various network Security and Cryptography	PO5/PSO1 to PSO3	Centre for academic research, Anna University Chennai.
2.	Hidden Markov Model Artificial Neural Network	Artificial Intelligence III/VI	11.10.2022	Requested to include various key Trends and Emerging Technologies in Neural Network	PO5/ PSO1 to PSO3	Centre for academic research, Anna University Chennai.
3	Exposure to Wi-Max, FANET	Mobile Computing III/VI	12-03-2022	Requested to include more Wi-Max, FANET Concepts	PO5/ PSO1 to PSO3	Centre for academic research, Anna University Chennai

B) Delivery details of content beyond syllabus:

The following additional activities have been initiated by the department of Computer science and Engineering to enhance the attainment of the POs and PEOs.

    a) Additional experiments in laboratories

    b) Industrial Internships

    c) Planning of Industrial Visits/Tours

    d) Awareness Programs

    e) Co-Curricular Activities

    f) Online Certification courses

    g) Activities under Professional bodies

2.1.2 C) Mapping of content beyond syllabus with the POs &PSOs:

Table 2.5.Mapping content beyond syllabus (2021-22)

CAYm1-2021-2022						
S. No	GAP	Action taken	Date-Month-Year	Resource person with designation	% of students	Relevance to po's,pso's
1	Hashing Techniques	Guest Lecture on"Hashing for Message Authentication"	10/09/2021	Mr.BalaMurugan.M Engineer, Infosys technologies Ltd, Chennai	95	1,2,3,4,5,9 & 1,2,3
2	JAVAFX Programming	Guest Lecture on "Fundamanetals JAVAFX Programming"	24/09/2021	Mr. Ragavendran.R, Senior test analyst, Barclays	95	1,2,3,4,5,9 & 1,2,3
3	Channel Allocation Problem using Wireless Sensor Network	Workshop on "Cybersecurity in Wireless Communication"	23/10/2021	Mr.Prabhakar.S Software Engineer Oracle india Pvt. Ltd, Chennai	98	1,2,3,4,5,9 & 1,2,3

4	Type-ii grammar missing	Webinar	30/10/2021	Mr.S.Kongeswaran.A CGI,Senior software Engineer	90	1,2,3,4,5,9 & 1,2,3
5	Pattern Based Applications	Guest lecture on "Introduction to Pattern based Applications"	13/11/2021	Mr.RakeshRagu nanathanSr.Asso ciate – Projects, Cognizant Technology solutions.	95	1,2,3,4,5,9 & 1,2,3
6	MD-5	Webinar on "Current Issues on MD-5"	20/11/2021	Mr.Arun.A Developer, IBOX Technology.	90	1,2,3,4,5,9 & 1,2,3
7	Edge Computing	Guest Lecture on "Edge computing with 5G."	27/11/2021	Mr.Vidhyasagar Technical Lead, Infosys Limited.	95	1,2,3,4,5,6 7,8,9& 1,2,3
8	Parallel Computing SIMD	Guest lecture on "Applications of parallel computer architectures tothe real-timesimulation	2/12/2021	Mr.Gopi Engineer, TCS	98	1,2,3,4,5,6 ,79& 1,2,3
9	Data Wareho using.	Guest lecture on "Recent Issues and applications on Data Warehousing Techniques.	03/01/2022	Mr.Rajanbabu Web developer, Amicizia Technology solution,Chennai.	90	1,2,3,4,5,9 & 1,2,3

| 10 | Graph Coloring problem | Work shop on "Current and Future trends of Graph Coloring Problem" | 07/01/2022 | Mr.Saran Raj Web developer, Finatel technology | 95 | 1,2,3,4,5,9 & 1,2,3 |

11	Real World Application of Linux OS	Guest Lecture on"Recent Issues and applications on Linux OS"	15/03/2022	Mr.Prasanna Kumar Developer, Cognizant Technology Solutions	90	1,2,3,4,5,6,7,8,9& 1,2,3
12	Testing Tool	Guest Lecture on "Recent Issues and applications of Testing Tool"	20/09/21	Mr.Venkatachalam, Director, Advanced Technologies,	95	1,2,3,4,5,9 & 1,2,3
13	WAMP Procedure and Working Principles	Webinar on "Contemporary issues in WAMP"	30/08/21	Mr.JaiSaravananK nackforge, chennai	98	1,2,3,4,5,9 & 1,2,3
14	Application of Stochastic Methodology in AI	Guest Lecture on "Introduction to Arrtificial Intelligence Techniques"	16/08/21	Mr.Venkatraman, Accenture Private Ltd	90	1,2,3,4,5,6,7,8,9& 1,2,3
15	5G Generation	Guest lecture on "Recent Trends in 5G Technology"	26/07/21	Mr.Karthick, Synfusion software solutions	95	1,2,3,4,5,9 & 1,2,3
16	Pastry	Webinar on "Current Issues and Trends in Pastry"	28/06/21	Mr.Vannirajan, Knackforge soft solution	95	1,2,3,4,5,9 & 1,2,3

| 17 | Portable Electronic Device Forensic | Guest Lecture on"Recent Trends and Applications of Protable Electronic Device Forensic" | 17/01/22 | Mr.Saran Raj Web developer, Finatel technology | 98 | 1,2,3,4,5,6 ,7,8,9& 1,2,3 |

18	Heap Allocation in Compiler	Guest lecture on "Current Trends and applications of Heap allocation"	08/11/21	Mr.Manus, Infosys,chennai	90	1,2,3,4,5,9 & 1,2,3
19	ICT Energy Demand	Guest lecture on "Introduction to ICT Technology"	25/10/21	Mr.Vimalkumar, Infotech Private Limited,chennai	95	1,2,3,4,5,6 ,7,8,9& 1,2,3

CAYm2-2020-2021						
S. No	GAP	Action taken	Date-Month-Year	Resource person with designation	% of students	Relevance to po's,pso's
1	Pattern Based Applications	Online Webinar on "Recent Trends and Issues of Pattern based Applications"	14/08/2020	Mr.Suresh.M, Knackforge soft solutions Private Ltd	90	PO:1,2,3,4,5,9 & PSO:1,2,3
2	JAVAFX Programming	Online Guest Lecture on "Fundamentals of JAVAFX Programming"	21/08/2020	Mr.Swamynathan.H , TCS	80	PO:1,2,3,4,5,9 & PSO:1,2,3
3	Edge Computing	Online Webinar on "Applications of Edge computing with 5G."	22/08/2020	Mr.SaravanaKumar.A, Dell India Private Ltd	95	PO:1,2,3,4,5,9 &PSO:1,2,3
4	MD-5	Online WebEx Seminar on "Recent Trends and Applications of MD-5"	05/09/2020	Ms.Saranya.R, Lucid Software Ltd	80	PO :1,2,3,4,5,9 & PSO:1,2,3
5	Hashing Techniques	Online Webinar on"Hashing for Message Authenticatio n"	19/09/2020	Mr.JaganathanKumar.K, Vishwak solutions	90	PO:1,2,3,4,5,9 & 1,2,3
6	Channel allocation problem using wireless sensor network	Online Webinar on "Computational Intelligence in Wireless Sensor Network "	26/09/2020	Mr.Madhan.M Hcl Technologies	90	PO: 1,2,3,4,5,9 &PSO: 1,2,3
	Type-ii	Webinar				

7	grammar missing		10/10/2020	Ms.Vidhyashree.D TCS	80	PO1,2,3,4, 5,6 7,8,9& PSO1,2,3
8	5G Generation	Online Webinar on "Industrial Applications of 5G Technology"	17/09/2020	Mr.Venkatraman.R , Accenture Private Ltd	90	PO:PO: 1,2,3,4,5,6 ,79&PSO: PSO: 1,2,3

9	Portable Electronic Device Forensic	Online Webinar on"Recent Trends and Applications of Portable Electronic Device Forensic"	13/02/2021	Mr.SaranRaj.R Web developer, Finatel technology	85	PO:1,2,3,4, 5,9 &PSO: 1,2,3
10	Heap Allocation in Compiler	Online Webinar on "Current Trends and applications of Heap allocation"	20/02/2021	Mr.Vidhyasagar.M Technical Lead, Infosys Limited.	80	PO:1,2,3,4, 5,9 & PSO:1,2,3
11	Testing Tool	Online WebEx Seminar on "Recent Challenge s and applicatio ns of Testing Tool"	06/03/2021	Mr.Dinesh.S, TCS	85	PO:1,2,3,4, 5,6 ,7,8,9& PSO: 1,2,3
12	Real world Application of Linux OS	Online Webinar on"Recent Issues and applications on Linux OS"	13/03/2021	Ms.Kalpana.A, SRM university	80	PO:1,2,3,4, 5,9 &PSO: 1,2,3
13	Parallel Computing SIMD	Online Webinar on "Application sof parallel computer architectures tothe real-timesimulati on	20/03/2021	Ms.RamyaMani.S, HCL	85	PO:1,2,3,4, 5,9 & PSO:1,2,3

14	Graph Coloring Problem	Work shop on "Current and Future trends of Graph Coloring Problem"	27/03/2021	Dr.Jaitunbi. A.K, RMD Engg college	80	PO:80
15	Data Wareho using.	Guest lecture on "Recent Issues and applications on Data Warehousing Techniques.	10/04/2021	Mr.K.VinothKumar.S, OFS Technologies	85	PO:1,2,3,4, 5,6 ,7,8,9& PSO:1,2,3

S. No	GAP	Action taken	Date-Month-Year	Resource person with designation	% of students	Relevance to po's,pso's
			CAYm3-2019-2020			
1	Channel Allocation Problem using Wireless Sensor Network	Online Webinar on "Computational Intelligence in Wireless Sensor Network "	01/11/2019	Mr.SaranRaj.S Web developer, Finatel technology	90	PO:1,2,3,4,5,9 & PSO:1,2,3
2	Pattern Based Applications	Online Webinar on "Recent Trends and Issues of Pattern based Applications"	02/11/2019	Mr.Prasannakumar.S Developer, Cognizant technology solutions	80	PO:1,2,3,4,5,9 &PSO: 1,2,3
3	Edge Computing	Online Webinar on "Industrial Applications of Edge computing with 5G."	09/11/2019	Mr.Venkatachalam.A, Director, Advanced Technologies, Ford.	95	PO:1,2,3,4,5,9 & PSO:1,2,3
4	Hashing Techniques	Online Webinar on"Hashing for Message Authentication"	23/11/2019	Mr.JaiSaravanan.K Knackforge, chennai	95	PO:1,2,3,4,5,9 & PSO: 1,2,3
5	5G Generation	Online Webinar on "Recent Trends and Challenges of 5G Technology"	30/11/2019	Mr.SaravanaKumar.A Dell India Private Ltd	96	PO:1,2,3,4,5,9 & PSO:1,2,3

6	MD-5	Online WebEx Seminar on "Current Trends and Issues of MD-5"	11/10/2019	Ms.Saranya.R, Lucid Software Ltd	90	PO:1,2,3,4,5,9 & PSO:1,2,3
7	JAVAFX Programming	Online Guest Lecture on "Fundamentals of JAVAFX Programming"	19/10/2019	Mr.SaranRaj.R, Web developer, Finatel technology	80	PO:1,2,3,4,5,67,8,9& PSO:1,2,3

8	Testing Tool	Online WebEx Seminar on "Recent Challenges and applications of Testing Tool"	07/03/2020	Mr.Vidhyasagar.M Technical Lead, Infosys Limited.	90	PO:1,2,3,4,5,6,7,9& PSO:1,2,3
9	5G Generation	Online Webinar on "Industrial Applications of 5G Technology"	14/03/2020	Mr.Vannirajan.A, Knackforge soft solution	90	PO:1,2,3,4,5,9 & PSO:1,2,3
10	Heap Allocation in Compiler	Online Webinar on "Current Trends and applications of Heap allocation"	21/03/2020	Mr.Arun.A, Developer, IBOX Technology.	95	PO:1,2,3,4,5,9 &PSO: 1,2,3
11	Portable Electronic Device Forensic	Online Webinar on"Recent Trends and Applications of Portable Electronic Device	08/02/2020	Mr.Venkatraman.R, Accenture Private Ltd	95	PO:1,2,3,4,5,6,7,8,9& PSO:1,2,3
12	Real world application in Linux OS	Online Webinar on"Recent Issues and applications on Linux OS"	15/02/2020	Mr.Karthick.K, Synfusion software solutions	90	PO:1,2,3,4,5,9 & PSO:1,2,3
13	Graph Coloring Problem	Workshop on "Current and Future trends of Graph Coloring Problem"	22/02/2020	Mr. RakeshRagunanathan.R Sr.Associate – Projects, Cognizant Technology solutions.	95	PO:1,2,3,4,5,9 &PSO: 1,2,3

○ **2.2.Teaching - Learning Processes**

2.2.1.Describe Processes followed to improve quality of Teaching & Learning

The stated Program Educational Objectives (PEOs) serves as guidelines for the graduates to achieve career and professional accomplishments. The PEOs are further transformed into specific student performance and behaviors that demonstrate student learning and skill development as Program Outcomes (POs). All courses have their own course outcomes which are mapped with relevant POs and PSOs. Achieving course outcomes is the direct way of accomplishing program outcomes hence the teaching-learning process and assessment methods are implemented in such a way to correlate with the POs.

The quality improvement of teaching learning process is customized by the following activities:

- Academic Calendar
- Use of Various instructional methods and pedagogical initiatives
- Methodologies to support weak students and encourage bright students
- Quality of classroom teaching
- Conduct of experiments
- Continuous Assessment in the laboratory
- Student feedback of teaching learning process and actions taken

The following diagram shows that Processes followed to improve quality of Teaching & Learning
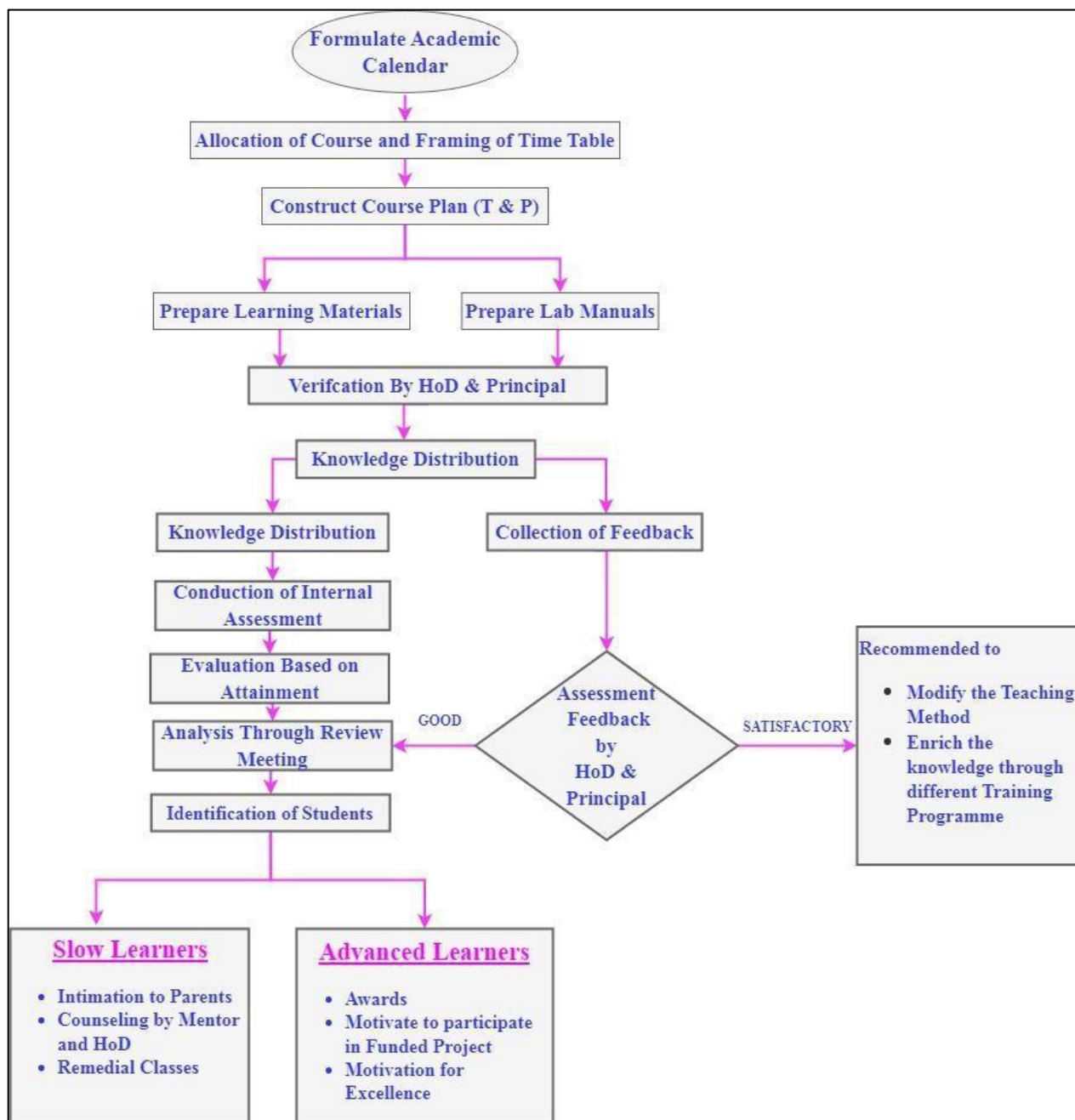

Fig 2.2. Processes followed to improve quality of Teaching & Learning A.AcademicCalendar :

The academic calendar is prepared based on the Anna University academic Schedule. The academic calendar includes Internal Assessment Tests, Syllabus Completion details, Class Committee Meetings, College Level Co-Curricular and Extra Curricular Activities ,Model Practical and Holidays. The institution completes the curricular activities within the planned time frame and as per calendar. The last working day of semester and University exam dates are announced by Anna University which is subject to change. Such necessary changes will be announced at the earliest.

B.Use of various instructional methods and pedagogical initiatives:

Initiative for Faculty in Instructional methods:

Induction Program:

○   Purpose of the Faculty Induction Programs to help newly recruited faculty adjust and feel comfortable in the new environment, inculcate in them the ethos and culture of the institution.

○   Help them build bonds with other faculty members, and expose them to a sense of larger purpose
○   and self-exploration.

Table 2.6. Faculty training to improve the Instructional Methods and Pedagogical Initiatives

Name of the Faculty	Type of Training	Knowledge Gained	Year of Training
Dr.B.GOBINATHAN	One day National Level Seminar	Outcome based Education	06.08.2022
Mrs.P.JAYASRI ARCHANA DEVI	Six days online FDP	Cyber Forensics and Machine Learning	25-07-22 to 27-07-2022
Mrs.M.JAYANTHI	Six days online FDP	Cyber Forensics and Machine Learning	11-07-2022 to 15-07-2022
Mr.S.SELVAKUMARAN	Six days online FDP	Cyber Forensics	11-07-2022 to 15-07-2022
Mrs.M.PAVITHRA RAO	One day National Level Seminar	Outcome based Education	06.08.2022
Mr.P.S.SATHEESH	One day National Level Seminar	Outcome based Education	06.08.2022
Mr.R.PRASHANTH	One day National Level Seminar	Outcome based Education	06.08.2022
Mrs.S.SIVAKAMI	Six days online FDP	Cyber Forensics	06.08.2022

Faculty Seminar:

A seminar is a lecture or presentation delivered on a particular topic or set of topics using the modern teaching aids that are educational in nature to disseminate the knowledge among the faculty members. This event will be executed once in a week, thereby their skills of handling the session gets enhanced.

Use of various instructional methods

The various instructional methodologies followed for each subject

ICT Supported Learning

NPTEL

Seminars

Tutorials

Assignments

Group activity (Quiz &Case study)

Industrial Training/Visit

Demo

Project

Pedagogical Initiatives:

1. Interactive classrooms:

Classes are made more interactive by encouraging student participation as follows:

- Asking questions that involve higher-order thinking skills like diagnostic, challenge, evaluation or prediction questions.
- Asking students to summarize the main points that they learned in class that day and the points they found most confusing.
- Providing course related worksheets for the better understanding of the subject.
- Asking the students to explain the relevance, utility, or significance of the information presented in the class.

2. Collaborative learning:

- Groups comprising a maximum of five to six students are formed in each class.
- One from the group will be designated as the group leader.
- Each group may be assigned tasks by the faculty and a report on the activity will be provided by the respective group leader.
- The focus of the tasks should be on learning new technologies, enhance the knowledge on a particular topic, studying new tools to be in pace with the industry, doing some mini projects, Presentation etc.

3. Rewinding concepts:

- It is one of the best practices used for improving the technical level of the students.
- Every semester the reopening day of the classes will be scheduled with rewind concept, where the previous semester core papers will be refreshed by the faculty members and some topics will be assigned as seminar for the students.

4. Group Discussion:

- Group discussions are arranged and facilitated by faculty members. Group removes shyness of students and develops their communication skill. It builds their self-confidence. It nurtures them to express their views regarding a subject in a polite manner.
- The recollection of such topics can be effectively carried out by hosting a Group Discussion rather than a lecture course delivery. This approach also paves way to improvise the communication and technical presentation skills of the students. The debate on topics by students effectively improvises the skills of the students.
- At times, the faculty member summarizes the topic for the non-participants of the group discussions such that they appreciate the need for recollection of the topic.
- At the end of a group discussion, the student members have clear and unbiased thoughts.

5. Seminar:

- Seminar plays a vital part of most academic courses and they give opportunity to students to discuss the topics in depth with other students, and with the faculty member.
- Seminar is designed for students to talk about topics in the particular course or lectures in detail.

6. Tutorial:

- Tutorial classes are conducted to train the students in analytical subjects.
- Facilitators promote self-learning and help the students to develop critical thinking skills in their own.
- Implementation of tutorial classes helps the students to clear analytical papers in University examination.

7. Guest lecture:

- The unique teaching capability of each faculty member is tapped in this method. The variety of perceptions of the same subject by different experts is experienced by the students.
- The method effectively works for courses of higher levels where the students get a blend of knowledge on focused topics.

8. Demonstration

● Learning Engineering demands on demonstrations. Demonstrations need not be working models. This style gives teachers opportunities to incorporate a variety of formats including lectures, multimedia presentations.

● Faculty members choose day-to-day essentials for demonstrations of engineering concepts. The approach is much suitable for basic level engineering courses so that the student recollects the basic concept each and every time he looks at the items.

Teaching Methodology:

The quality improvement of teaching learning process is customized by the following activities:

Academic Calendar

Allocation of Course

Course Plan

Content delivery process

Conduct of assessment

Segregations of learners

Feedback Process

C.Methodologies to support slow learners and encourage advanced learners

Observation of students' performance in class: Based on the interaction and discussions during class hours and tutorial sessions.

Analysis of the performance in assessment tests: Based on the performance in, internal assessment tests and model examination**.**

Review of previous semester results: Slow learner and bright students are identified at the beginning of the semester based on the previous semester results (grades obtained and number of arrears etc.).

The following diagram depicts that the process of identification of Slow learner and advanced learners is shown in Figure
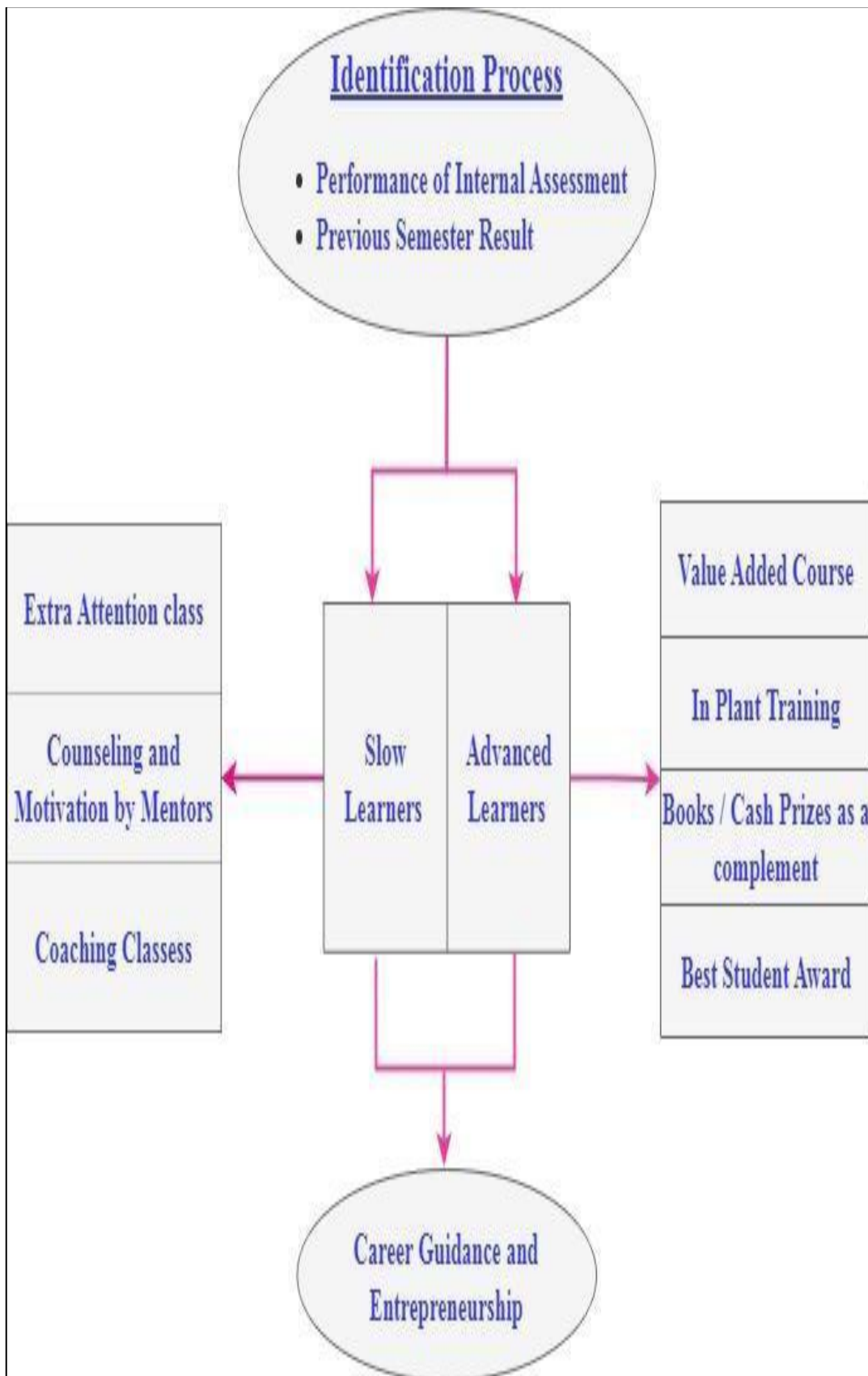
Fig.2.3. Identification of students

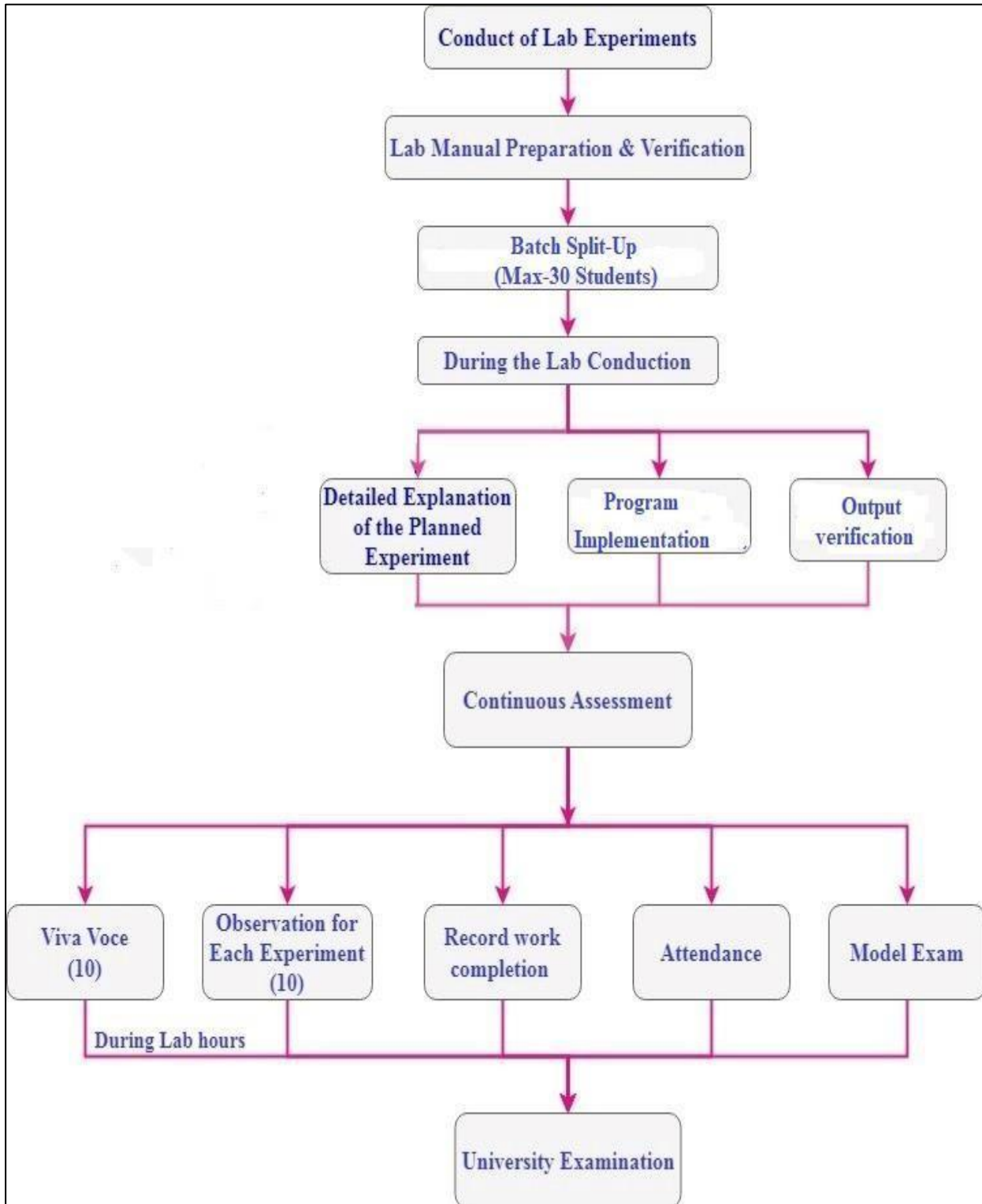**The following diagram describes the Conduct of Experiments (Observation in lab)**

Fig:2.4. Conduct of Experiments

Procedure for the conduct of lab experiments

No of students per Batch = 30 Students

Check observation book in detail (Aim, algorithm, program code etc)

Execute program with the help of Faculty members

Evaluate output with expected output.

Ask viva question and procedure for the conduct of experiments to each students

Discuss with faculty in charge (if any clarifications)

A lab manual will be maintained in each laboratory.

Each laboratory include two types of experiments

Experiments in the prescribed syllabus.

Content beyond the syllabus

All the experiments in the prescribed syllabus will be compulsorily followed and completed before the end of the semester.

The objective and the procedure for all experiments in the prescribed syllabus will be available in the lab manual.

Continuous Assessment in the Laboratory

For every experiment conducted by the student, marks are awarded according to his/her level at different phases so that students can pay required attention at every stage of laboratory sessions in order to score better.

Proper submission of observation and records for the completed experiments in time enables the students to get their due credit for it.

A model practical examination, with due share in internal assessment marks, is conducted at the end of the semester to prepare the students for the ensuing University Practical Examinations.

Observation	Record	Program	Execution	Result	Viva voce	Cumulative
5	10	10	10	5	10	50

Student Feedback of Teaching learning process and actions taken

The Head of the Department will provide some suggestions for improvement based on the feedback if required.

The questionnaire is prepared covering all areas of faculty's including ability of teaching, quality of learning, class-handling attitude, acceptance authority by students, etc where students are asked to record their opinion directly.

All the comments by the students in the feedback forms will be communicated to the respective faculty members along with their feedback levels to know their strengths and weaknesses and to enhance their teaching skills.

Process:

The following diagram shows that Student feedback of teaching learning process and actions taken Clas
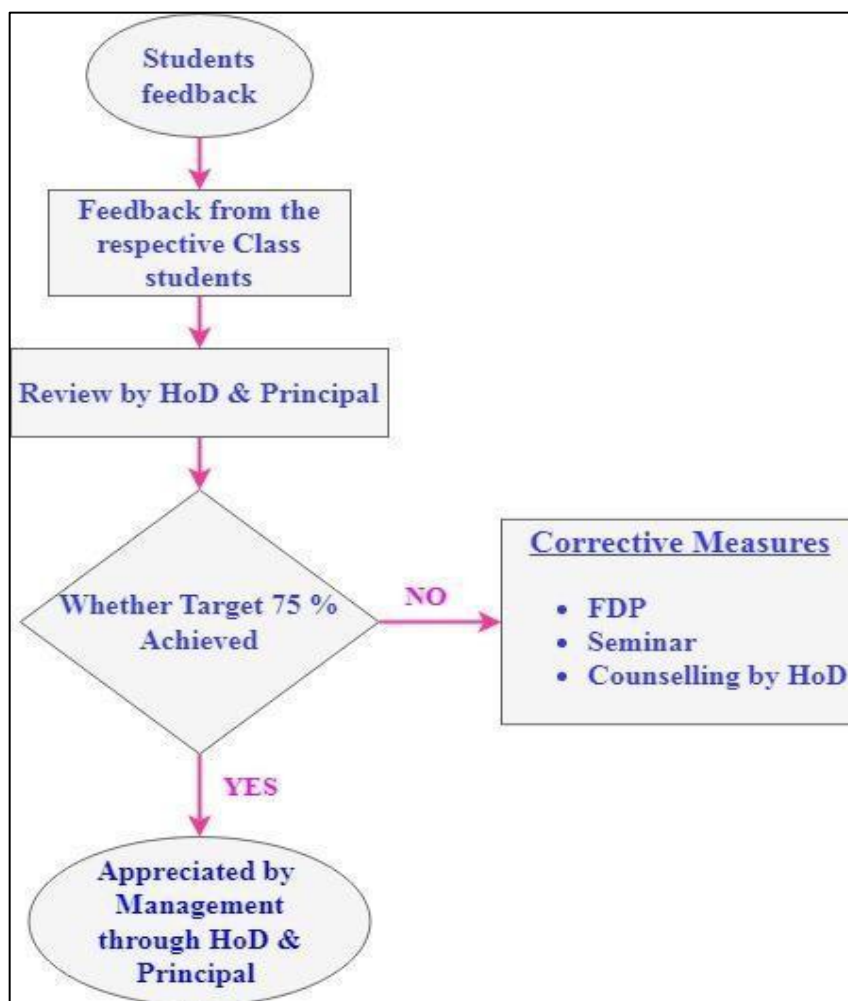

Fig: 2.5.Student feedback of teaching learning process and actions taken

Class Committee Meeting:

Class Committee Meetings are conducted thrice in a semester to convey information regarding academic activity and know the issues of students. It is headed by the Chairperson.

The members of Class Committee meeting are

> Chairperson
>
> HOD
>
> Class Advisor
>
> Faculty handling the subjects
>
> Student representatives

Initially Circular is formed with an agenda and circulated to faculty and students. On the class committee day, the points concerning agenda will be discussed. The Chairperson will circulate the minutes of the meeting to the subject in-charges.

Finally Student representatives are asked to discuss the same in the classroom, in which the actions taken by the department shall be transparent to all students.

The Action taken for the issues discussed will be intimated to the Principal through HOD.

2.2.2 Quality of internal semester Question papers, Assignments and Evaluation

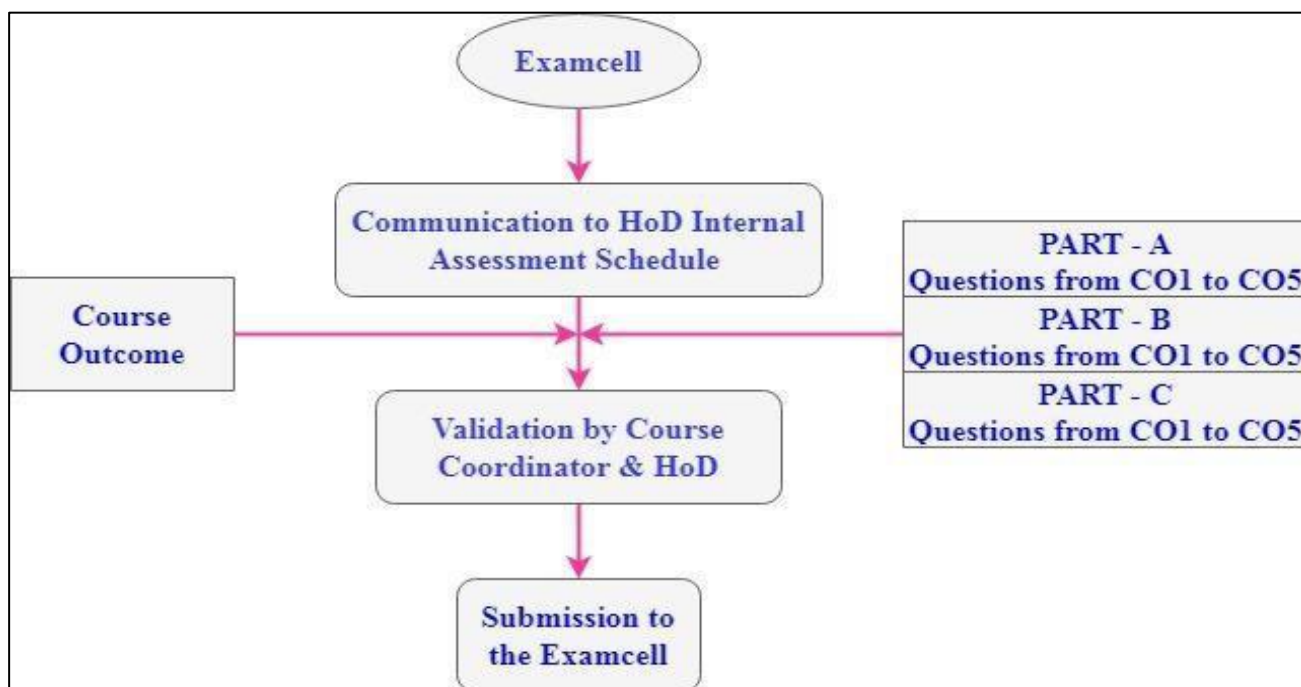**The following diagram shows that process of Internal Assessment Question Paper Setting**

Fig: 2.6. Process of Internal Assessment Question Paper Setting

A.INTERNAL SEMESTER QUESTION PAPER

☐ All tests are conducted in strict adherence to the academic calendar which will be made with the concurrence of Anna University portal entry.

☐ The question papers for each subject are set in such a way that it maps to the Course Outcomes of the respective subject.

☐ For each subject two question paper along with answer key will be prepared by the corresponding course in charges and submitted for the approval by the Head of the Department.

☐ The question paper will be verified by the Head of the Department and may accept with or without modifications.

☐ The question paper has to be prepared and submitted well in advance (Two days before the exam commencement period) to the exam cell.

- For the model assessment exam the question papers will be prepared by the experienced and eminent professors from reputed and benchmark institutions.

- The questions asked in each subject are categorized as below:

  - ❖ K1 –Remember
  - ❖ K2 –Understand
  - ❖ K3 –Apply
  - ❖ K4 –Analyze
  - ❖ K5 –Evaluate
  - ❖ K6 -Create

- All course outcomes will be achieved through the tests conducted in each semester.

- The above process of conduction of the internal examinations is routed through the Local Exam Cell for proper monitoring and effective implementation.

C.Evidence of COs coverage in class test / mid-term tests

- Sample of question paper and answer key are shown below which shows the level of course outcomes and knowledge level coverage.

- The marks are awarded for each question thereby we are able to calculate the attainment for the individual Course outcomes.

- The attained marks for the individual course outcomes are used to calculate the attainment level.

IAT QUESTION PAPER WITH BLOOM'S

Reg.No

	JAYA SAKTHI ENGINEERING COLLEGE [AFFILIATED TO ANNA UNIVERSITY, CHENNAI] Thiruninravur– 602 024, Thiruvallur Dt., Tamil Nadu.

INTERNAL ASSESSMENT EXAMINATION -III (B.E. / B.Tech)

(2021-Regulation)

Sub. Code/Sub.Name:CS3391/Object Oriented Programming Language

Branch/Sem: CSE/ III

Time : 3 Hours   **Maximum Marks:100**

Answer ALL the questions

PART – A (10 x 2 = 20 Marks)

Q.No.	Questions	KL	CO Attainment
1.	Define objects and classes in java.	K1	CO1

2.	What is access specifier	K1	CO1
3.	Describe the uses of interfaces in java	K2	CO2
4.	Define abstract classes.	K1	CO2
5.	State the use of try block in java exception handling.	K2	CO3
6.	What is multithreading.	K1	CO3
7.	How generic programming is used in java.	K2	CO4
8.	Write some java string class method with example	K3	CO4
9.	List out some types of events.	K1	CO5
10.	Write a java program for create a button.	K3	CO5

PART – B (5*13=65 Marks)

Q.No.		Questions	KL	CO Attainment
11	a.	Explain the various features of oops. (6m) Write a programming structure in java with example. (7m)	K1	CO1
		(OR)		
	b.	Define constructor and its types. (6m) Write a java program to copy the value from one object toanother object. (7m)	K1	CO1
12.	a.	Describe in detail about different types of inheritance with an example. (13m)	K2	CO2
		(OR)		
	b.	Distinguish the following with suitable examples. i)Method overloading (7m) ii)Method overriding. (6m)	K2	CO2
13	a.	Explain different types of Exception and Exception hierarchy in java with appropriate example.	K1	CO3
		(OR)		
	b.	Paraphrase inter thread communication and suspending, resuming, and stopping threads	K2	CO3
14	a.	Summarize the various string class methos with example.	K3	CO4
		(OR)		
	b.	Illustrate the concept of generic program with example.	K3	CO4
15	a.	Explain in detail about layout pane with an example.	K2	CO5
		(OR)		
	b.	Produce javafx control for checkbox and radio button.	K3	CO5

| 16 | a. | Explain about thread synchronization with an example. | K2 | CO4 |

	(OR)		
b.	Create a simple real life application program in java to illustrate the use of multithreads.	**K3**	**CO4**

PART – C (1 x 15 = 15 Marks)

Table of Specifications (Question – Wise)

Outcome	No. of Questions						
Unit	K1 Remembering	K2 Understanding	K3 Applying	K4 Analyzing	K5 Evaluating	K6 Creating	Total
I	4						4
II	1	3					4
III	2	2					4
IV		2	4				6
V	1	1	2				4
Total	8	8	6				22

Table of Specifications (Marks – Wise)

Outcome	Marks						
Unit	K1 Remembering	K2 Understanding	K3 Applying	K4 Analyzing	K5 Evaluating	K6 Creating	Total
I	17						17
II	2	15					17
III	15	2					17
IV		2	30				32
V	2	13	2				17
Total	36	32	32				100

Subject Incharge   **HOD**

Quality of Evaluation:

·After internal assessment test, course handling faculty member evaluates the answer scripts within 3 days after completion of the examination.

· Paper valuated by the respective staff members with answer key/interchanged correction can be done if needed.

· Submission of answer scripts for verification to ensure the completion of valuation.

· Distribution of answer scripts to students on the next day.

Review Procedure

☐ Soon after the completion of the mark entry in the Mark analysis statement will be prepared by the concerned class advisors, circulated and verified by the subject in-charges, students, Head of The Department, Principal.

☐ After this process presentation regarding the class performance will be headed by Principal with the team comprising of Head of The Department, Subject In-charges.

☐ Complete analysis, suggestions, remedial measures will be given by the Principal for better improvement in the forthcoming exams.

☐ Minutes of the meeting regarding the Review meeting will be recorded for further action.

☐ A letter report comprising of the mark statement of the individual student will be sent to their parent soon after the completion of the exam.

☐ As a corrective measure counseling will be done individually with the student along with or without their parent based on their performance in the assessment exams.

☐ To encourage the best performers in the internal exam, Cash/prize amount will be issued as a token of appreciation for their performance.

D.Quality of assignments and its relevance to Cos

☐ The main objective of assignment is to promote self-learning.

☐ A minimum of two assignments will be given for each subject, which cover the course outcomes of the subject

☐ The questions given are categorized to knowledge, comprehension, application, analysis, evaluation and synthesis level.

2.2.3.Quality of student projects.

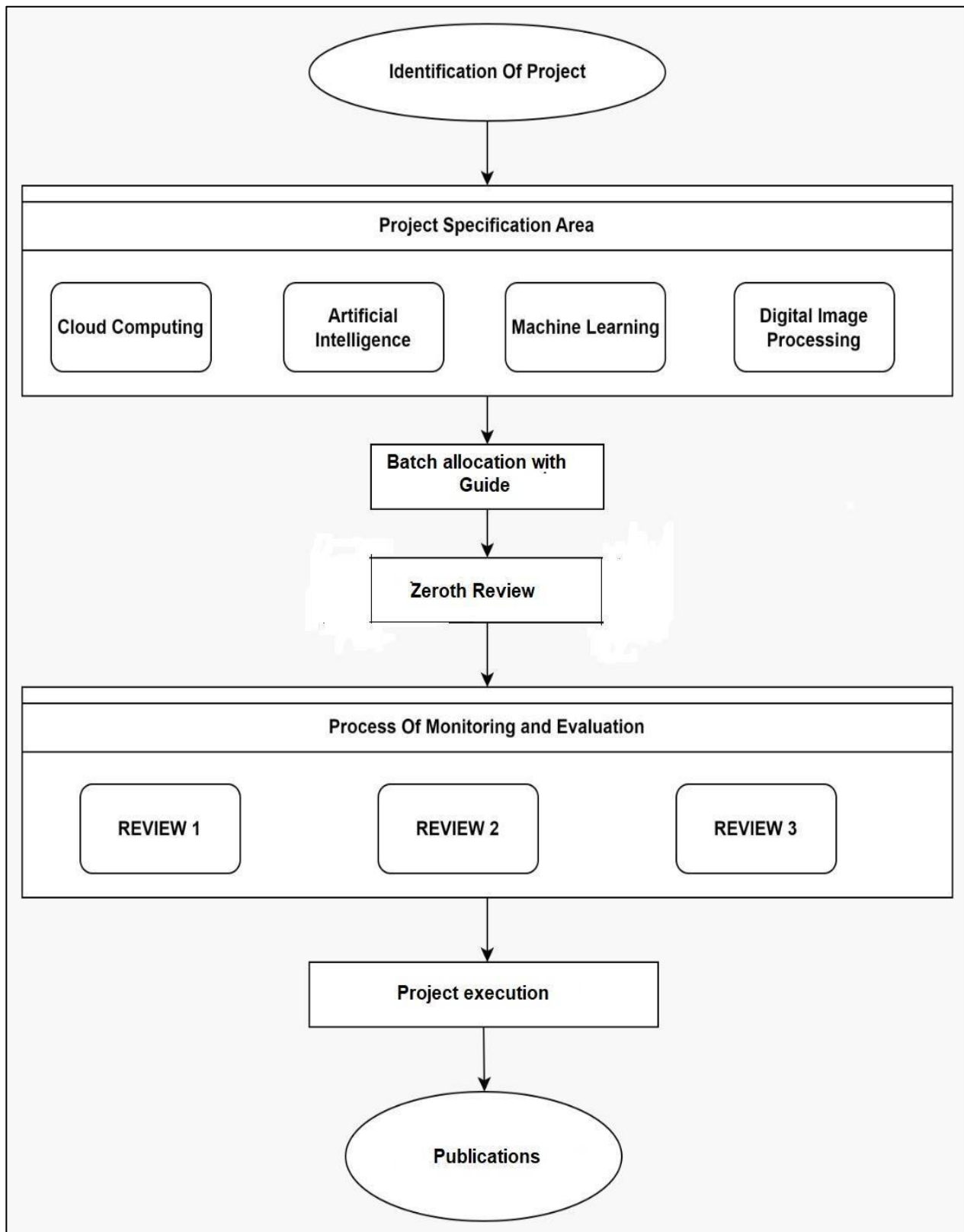**The following diagram shows that Process flow chart for identification of project**

Figure 2.7. Process flow chart for identification of project

A.Identification of projects and guide allocation methodology:

❖ As part of Anna University curriculum, students have to undertake a project in their final semester of study. The objective of final semester project is to develop student's knowledge for solving technical problems in recent technology. Students are provided with brief idea of various fields for selecting their project titles.

❖ Upon completion of their project, students are able to identify and describe the problem and scope of the project

- Batch allocation based on specific domain (Maximum 4 per batch)
- Guide allotted for each batch based on the domain
- Zeroth review will be conducted for choosing the title of the project under the domain selected by the batch.

- A review committee is formed comprising of Project Coordinator, Project Supervisor and Internal experts for analyzing the project.
- Maximum of three reviews will be conducted and evaluated for the best outcome of the project
- The student shall make presentation on the progress made by him / her before the committee.
- The total marks obtained in the three reviews will be reduced for 20 marks and rounded to the nearest integer.
- The project report shall carry a maximum 30 marks. The viva- voce examination shall carry 50 marks. Marks are awarded to each student based on the individual performance in the viva-voce examination.

Batch Allocation:
- The topics for the projects are selected in such a way that it caters the following parameters:
  ❖ Innovation
  ❖ Novelty
  ❖ Societal desires
  ❖ Engineering Solution for the Real world challenges
  ❖ Cost effective
  ❖ Meeting the corporate needs
  ❖ Industrial, Scientific Research & Medical application topics are highly encouraged

Students are instructed to carry out literature survey by referring reputed journals and articles to identify the problem statement and propose suitable solution. **The students are encouraged to apply for Project sponsorship (TNSCST, Google summer up).**

B.Types and Relevance of the Projects and their contribution towards attainment of POs&PSOs :

SL. no	Domain	2020-2021	2021-2022	2022-2023
1.	Cloud computing	2	2	3
2	Wireless sensor network	2	2	2
3	Digital image processing	3	2	3
4	Machine learning	2	3	2
5	Artificial intelligence	3	4	2

Students are encouraged to do projects in the following categories

1. Product
2. Application
3. Simulation
4. Research

Each project is evaluated based on the project's contribution and attainment of program outcome, such as engineering knowledge, problem analysis, design/development of solutions, conducting investigations of complex problems, modern tool usage, engineer and society, environment and sustainability, ethics, individual and team work, communication, project management and finance and life-long learning by the project supervisor. These projects are then categorized into 3 types - best, average and below average.

Review	Time line	Description
Zeroth Review	End of December month	Title , Abstract
First Review	End of January month	Title, Abstract ,Introduction, Literature Survey
Second Review	End of February month	Title, Abstract, Design for ProposedSystem
Third Review	End of March month	Title, Abstract, Detailed Design (if any deviation), Computational Analysis (If required), Experimental (if any deviation)
Viva Voce	April month	Tile, Abstract, Overall Design, Experimental Results Performance Evaluation, Report Submission

Review	Time line	Evaluation Process
Zeroth Review	End of December month	Based on the presentation and the discussion made during the review, the title of the project is tentatively fixed. Subsequently the guides of the projects were allocated.
First Review	End of January month	Problem Identification based on the literature, similarly the industrial problems also identified based on the problems faced by industries.

Second Review	End of February month	Methodologies were identified to solve the problem and the responsibility of each individual team member to accomplish the project is fixed
Third Review	End of March month	The detailed plan and methodology of the project is finalized. The budget and duration of the project is presented and to be finalized.
Viva Voce	April month	Internal assessment mark of the project is awarded based on the evaluated scores obtained from reviews. End semester Examination mark is based on the evaluation in the final review (Viva-voce) by both internal and external examiners

Steps followed for monitoring and evaluating the students' performance

Step 1 : Reviews are conducted as per the project review schedule which is prepared by the project coordinator.

Step 2 : After each review, the Project Review committee awards marks based on performance metrics for each batch of students.

Step 3: Students are instructed to identify the best journals and conferences to publish their work.

Step 4: The project report is evaluated and marks are awarded based on the quality of work by the concerned supervisor.

Step 5 : The students' performance in viva voce is assessed and marks are awarded accordingly by the internal and external examiner.
Step 6: The marks from reviews, attendance and viva voce is summed and assessed for correlation with Program Outcomes and Program Specific Outcomes.

S.No	Project area	POs mapped	Justification

| 1 | Cloud computing | PO1
PO2
PO4
PO5
PO7
PO8
PO9
PO10
PO11
PO12
PSO1
PSO2
PSO3 | | **PO1**: Students can apply the knowledge of engineering fundamentals for find the solution of complex engineering problems.
 PO2: Manipulation, interpretation and identification of the various transforms for various applications.
PO4: Conduct investigations of complex problems:
 PO5: Utilization of sophisticated software and hardware modules depending on the type of application.
PO7: Understand the impact of the professional engineering solutions in societal and environmental contexts |

			PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
			P09: Enhances the team forming, decision making capability when working as a team.
			P10: Needs communication effectively to deliver the project through presentation
			P11:Application of management principles to manage projects in various environment
			P12: Provides lifelong learning. Provide
			PSO1:ProvideProgramming skills to build and automate business solutions
			PSO2: Provide elegant solutions to complex problems
			PSO3: Design, build and develop system applications

| 2 | Wireless sensor network | PO1
PO2
PO4
PO5
PO7
PO8
PO9
PO10
PO11
PO12
PSO1
PSO2
PSO3 | **PO1**: Students can apply the knowledge of engineering fundamentals for find the solution of complex engineering problems.

PO2: Manipulation, interpretation and identification of the various transforms for various applications.

PO4: Conduct investigations of complex problems:

PO5: Utilization of sophisticated software and hardware modules depending on the type of application.

PO7: Understand the impact of the professional engineering solutions in societal and environmental contexts

PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice |

			P09: Enhances the team forming, decision making capability when working as a team.
			P10: Needs communication effectively to deliver the project through presentation
			P11:Application of management principles to manage projects in various environment
			P12: Provides lifelong learning.
			Provide
			PSO1:ProvideProgramming skills to build and automate business solutions
			PSO2: Provide elegant solutions to complex problems
			PSO3: Design, build and develop system applications

| 3 | Digital image processing | PO1
PO2
PO4
PO5
PO7
PO8
PO9
PO10
PO11
PO12
PSO1
PSO2
PSO3 | | **PO1**: Students can apply the knowledge of engineering fundamentals for find the solution of complex engineering problems.
PO2: Manipulation, interpretation and identification of the various transforms for various applications.
PO4: Conduct investigations of complex problems:
PO5: Utilization of sophisticated software and hardware modules depending on the type of application.
PO7: Understand the impact of the professional engineering solutions in societal and environmental contexts
PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
P09: Enhances the team forming, decision making capability when working as a team.
P10: Needs communication |

			effectively to deliver the project through presentation
			P11:Application of management principles to manage projects in various environment
			P12: Provides lifelong learning.
			Provide
			PSO1:ProvideProgramming skills to build and automate business solutions
			PSO2: Provide elegant solutions to complex problems
			PSO3: Design, build and develop system applications

| 4 | Machine learning | PO1
PO2
PO4
PO5
PO7
PO8
PO9
PO10
PO11
PO12
PSO1
PSO2
PSO3 | | **PO1**: Students can apply the knowledge of engineering fundamentals for find the solution of complex engineering problems.
PO2: Manipulation, interpretation and identification of the various transforms for various applications.
PO4: Conduct investigations of complex problems:
PO5: Utilization of sophisticated software and hardware modules depending on the type of application.
PO7: Understand the impact of the professional engineering solutions in societal and environmental contexts
PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
P09: Enhances the team forming, decision making capability when working as a team.
P10: Needs communication effectively to deliver the project through presentation
P11:Application of management principles to |

			manage projects in various environment
			P12: Provides lifelong learning.
			Provide **PSO1**:ProvideProgramming skills to build and automate business solutions
			PSO2: Provide elegant solutions to complex problems
			PSO3: Design, build and develop system applications

5	Artificial intelligence	PO1 PO2 PO4 PO5 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3	**PO1**: Students can apply the knowledge of engineering fundamentals for find the solution of complex engineering problems. **PO2:** Manipulation, interpretation and identification of the various transforms for various applications. **PO4**: Conduct investigations of complex problems: **PO5**: Utilization of sophisticated software and hardware modules depending on the type of application. **PO7**: Understand the impact of the professional engineering solutions in societal and environmental contexts **PO8**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice **P09:** Enhances the team forming, decision making capability when working as a team. **P10**: Needs communication effectively to deliver the project through presentation **P11**:Application of management principles to manage projects in various environment **P12:** Provides lifelong learning. Provide

| | | | | PSO1:ProvideProgramming skills to build and automate business solutions PSO2: Provide elegant solutions to complex problems PSO3: Design, build and develop system applications |

Project Batch list (2018– 2022)

S.no	Project title	Type	Domain	PO and PSOs Mapping
1.	Randomized Conversation Matrix Based Shoulder Surfing Resistant System	Application	Machine learning	PO1,PO2,PO3,PO4,PO5,PO7,PO8, PO9,PO10, PO11, PSO1,PS02
	Justification :Student can creates the application user login in website crime data in randomized conversation matrix based shoulder surfing resistant system.			
2	Flexible-Event-Triggered Filter-Design With Restraint And Cyber Attacks	Analysis	Network Security	PO1,PO2,PO3,PO4,PO5,PO7,PO8, PO9,PO10, PO11, PSO1,PS02
	Justification: Student can analyze the cyber attacks usingCryptographic technique.			
3	Random Forest Model With Label Text Encoder In Pharmacies	Analysis	Machine learning	PO1,PO2,PO3,PO4,PO5,PO7,PO8, PO9,PO10, PO11, PSO1,PS02
	Justification: Student can analyze Label Text Encoder In Pharmacies using Machine learning .			

4	Embedding Audio And Video For Secure Data Transfer Using Lsb And Wavelet Transform	Analysis	Image processing	PO1,PO2,PO3,PO4,PO5,PO7,PO8, PO9,PO10, PO11, PSO1,PS02
	Justification: Student can analyze Lsb And Wavelet Transformusing Image processing.			
5	Real Time Weapon Detection Using Region Based Spatio-Temporal Machine Learning Techniques	Application	Machine learning	PO1,PO2,PO3,PO4,PO5,PO7,PO8, PO9,PO10, PO11, PSO1,PS02
	Justification : Student can creates the Real Time Weapon DetectionUsing Region Based Spatio-Temporal Machine Learning Techniques			

PROJECT COURSE OUTCOMES:

Students will be able to,

- Survey the articles related to the area of Specialization and identify the problem.

- Analyze the available methodologies to solve the problem identified.

- Propose a solution and create the process flow as a team.

- Design and develop a prototype to bring the proposed solution ethically.

- Implement the prototype as a working model for the intended application**.**

C. Process for monitoring and evaluation:

- The teacher acts as a facilitator by initiating the project and giving guidance, input and feedback during the project.
- He / She encourages all the students to participate and ensures that the student accomplish their tasks as scheduled.
- The progress of the project is evaluated based on minimum three reviews at various stages of the project implementation.
- The review committee consisting of senior faculty member is constituted by the Head of the Department.
- Students will present the progress of their project for each stage of implementation during each review meeting conducted by the review committee.
- The presentation will cover all the relevant factors, from the problem formulation till the particular stage along with the simulation and hardware details which they have inferred before the review.
- The reviewers will take the points presented into consideration and the test data / results / screenshots and elicit information on those angles not covered or partly covered in the presentation.
- Students are directed to maintain a project diary to record the activities they do in relation with project.
- Students should also record the details of their interactions with the guide in the project diary.
- The feedback of the performance will be given to students to improve the quality of work.

Project review Mark distribution

The mark split up for final review conducted by university has given below

			End semester examinations

Review 1 (Marks)	Review 2 (Marks)	Review 3 (Marks)	Thesis Submission (30 Marks)		Viva- Voce (50 Marks)		
			Internal 15	External 15	Internal 15	External 20	Supervisor 15
5	7.5	7.5					

D.Process to assess individual and team performance:

Students will present the progress of their project for each stage of implementation during each review meeting conducted by the review committee.

E.Quality of completed projects/working prototypes:

Project review committee evaluates the quality of project based on the following criteria:

- Analysis, system requirements,design,implementation and testing.
- Application oriented, Research oriented and projects having societal impacts.
- Projects suitable for applying for patents, publishing papers in National conference, International conference and reputed journals.

● Project enabling the students to improve their organizational and research skills which develop better communication with their peers.

2.2.4.Initiatives related to industry interaction

Initiatives

Department of academic advisory committee is constituted by involving an active industry person as a member of the committee.

Department of Computer Science and Engineering have signed MOUs with some industries.

To promote outcome based education and enhance employability skills among students, value added courses and additional contents through lectures by adjunct faculty are conducted.

Department provides platform for students to visit industries and undergo internships and In- plant training.

S.NO	INITIATIVES
1	Workshop
2	Value Added Course
3	Guest Lecture
4	Training Program
5	MoU
6	In-plant training /Internship
7	Symposium/Conference
8	Project

Implementation

Department of Computer Science and Engineering has implemented several initiatives to strengthen Industry-Institute interaction. The academic year wise details of the initiatives are listed as below.

Academic year	Mode	Details	Venue	Dates
2021-22	Workshop	Training on Oracle Big Data	JSEC-COMPUTER LAB-1	6/8/2022
		Workshop on Java and Basic Concepts		13/8/2022
		Expert Lecture on IOT		20/08/2022
	Value added courses	Cloud computing by AWS	JSEC-CSE seminar hall	8/10/2022
		Android development with kotlin by Google		14/10/2022 to 15/10/2022
		Business process automation by celonis		21/10/2022
		Machine learning on ramp by math works		22/10/2022
		Automation 360 RPA essentials student preparation by Automation anywhere		29/10/2022

Guest Lecture	Guest lecture for Theory of computation	JSEC-COMPUTER LAB-1	24/11/2022
	Guest lecture on big data analytics	JSEC-CSE seminar hall	27/08/2022
	Guest lecture on React	JSEC-COMPUTER LAB-1	10/09/2022
	Guest lecture on Out of Box with IOT	JSEC-CSE seminar hall	17/09/2022
	Guest Lecture on "Design Thinking"	JSEC-COMPUTER LAB-1	15/10/2022
Training Program	Training program on AWS	JSEC-COMPUTER LAB-1	18/08/2022
	Training program on web technology	JSEC-CSE seminar hall	19/8/2022
	Training program on data analytics	JSEC-COMPUTER LAB-1	20/08/2022
	Training Program on cloud computing	JSEC-CSE seminar hall	25/08/2022

		Training program on data science	JSEC-COMPUTER LAB-1	26/08/2022
	Symposium	Software freedom day	JSEC-CSE seminar hall	17/09/2022
2020-2021	Workshop	Online Workshop on mobile computing and its applications	JSEC-COMPUTER LAB-1	16/09/2021
		Webinar on IT in space	JSEC-COMPUTER LAB-1	09/10/2021
		Online workshop on biometric security system	JSEC-COMPUTER LAB-1	27/11/2021
		Webinar on postulates of human computer interface	JSEC-COMPUTER LAB-1	08/1/2022
	Value Added Courses	Ethical hacking	JSEC (online)	24/01/2022 to 31/01/2022
		Web development with React	JSEC(online)	1/11/2021 to 6/11/2021

		National small industries corporation	Chennai	9/9/2022
Industrial Visit		BSNL	Chennai	28/05/2022
	Training Program	Training program on web design	JSEC-COMPUTER LAB-1	09/10/2021 to 16/09/2021
		Training program on AWS	JSEC-COMPUTER LAB-1	07/08/2021 to 14/08/2021
		Training program on cyber security	JSEC-CSE seminar hall	07/08/2021 to 14/08/2021
2019-2020	Value Added Courses	i. Value added course on PC HARDWARE and NETWORKING.	JSEC (online)	18/08/2020 to 24/08/2020
		ii.ASP.NET With C#	JSEC (online)	03/08/2020 to 08-08-2020
		Web Technology	JSEC (online)	15/03/2021 to 21/03/2021
		Interactive Multimedia Development	JSEC (online)	10/08/2020 to 17/08/2020

Guest Lecture	Impact of Machine Learning on research using python	JSEC-COMPUTER LAB-1	26/09/2020
Industrial Visit	National small industries corporation	Chennai	9/9/2022
	BSNL	Chennai	28/05/2022
Training Program	Training program on web design	JSEC-COMPUTER LAB-1	09/10/2021 to 16/09/2021
	Training program on AWS	JSEC-COMPUTER LAB-1	07/08/2021 to 14/08/2021
	Training program on cyber security	JSEC-CSE seminar hall	07/08/2021 to 14/08/2021

A. Industry supported laboratories

2021-2022

Sl.No	Name of the Industry	Details of Equipments	Objective of the Lab	Utilization& Effectiveness
1	Skill sort Technical Solutions Pvt. Ltd	Skill Training	Placement	Computer lab-3

B. **Industry involvement in the program design and partial delivery of any regular courses for students.**

Memorandum of Understanding (MoU) Details:

S.No	Name of the institution/ industry/ corporate house with whom MoU is signed	Year of signing MoU
1	Skill sort Technical Solutions Pvt Ltd	2022
2	SSB Software Solutions Pvt Ltd	2021
3	Pantech E-Learning Pvt.Ltd	2021
4	Lifo Technologies Pvt.Ltd	2021

Guest Lecture Summary with Industrial Experts 2022-2023		
EVENT	**FACULTY NAME AND DESIGNATION**	**PROGRAM OUTCOME**
Guest lecture for Theory of computation	**Mr.Balamurugan** **Engineer,** **Infosys technologies Ltd, Chennai.**	**PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3**
Guest lecture on big data analytics	**Mr. Ragavendran,** **Senior Test Analyst,** **Barclays.**	**PO6, PO8, PO9, PO10,**
Guest lecture on React	**Mr.Prabhakar**	**PO11,PO12,PSO1,PSO3**

EVENT	FACULTY NAME AND DESIGNATION	PROGRAM OUTCOME
	Software Engineer Oracle india Pvt. Ltd, Chennai	
Guest lecture on Out of Box with IOT	Mr.kongeswaran, CGI, Senior software engineer.	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3
Guest Lecture on "Design Thinking"	Mr. RakeshragunanathanSr. Associate –Projects, Cognizant Technology solutions.	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3

Guest Lecture Summary with Industrial Experts

2021-2022

EVENT	FACULTY NAME AND DESIGNATION	PROGRAM OUTCOME
Impact of Machine Learning on research using python	Mr.Arun Developer, IBOX Technology.	PO6, PO8, PO9, PO10, PO11,PO12, PSO1, PSO3
Recent Technology Stacks-Full Stack Web and Mobile Development	Mr.Vidhyasagar Technical Lead, Infosys Limited.	PO6, PO8, PO9, PO10, PO11,PO12, PSO1, PSO3
Role of IOT in Industry and Academia	Mr.Gopi Engineer, TCS.	PO6, PO8, PO9, PO10, PO11,PO12, PSO1, PSO3

Webinar on Industrial Requirements from Fresher's and Current Trends in IT Industry	**Mr.Rajanbabu** **Web developer,** **Amicizia Technology** **solution,** **Chennai.**	**PO6, PO8, PO9, PO10,** **PO11,PO12, PSO1, PSO3**
Data Mining in Search Engine Analytics	**Mr.Saran Raj,** **Web developer,** **Finatel Technology.**	**PO6, PO8, PO9, PO10,** **PO11,PO12, PSO1, PSO3**

C.Impact analysis of industry institute interaction and actions taken thereof

The students of the department have shown keen interest to undertake courses offered by the course of excellences.

Students have successfully completed the given courses.

Students will analyze the concepts of industry practices and needs of the industry

Feedback will be collected from the students

2.2.5.**Initiatives related to industry internship/summer training**

(Mention the initiatives, implementation details and Analysis)

   A. Industrial training/tours for students

Industrial visit is a part of the professional courses, during which students visit companies and get insight on how companies work and also useful information related to the practical aspects of the course which cannot be visualized in lectures.

- With an aim to go beyond academics, these visits are arranged to develop the insights of the students – attaining practical knowledge and their theoretical applications there of

- To expose the industrial environment to the students

- To gain the practical knowledge and outcome based learning

Procedure

- Plan the IV schedule as per the following guidelines

- Dates as mentioned in the department academic schedule

- Separate place of visit for boys and girls except first year students

- One day IV for second, third and three day IV for final year students

- Get the students willingness list in concurrence with their parents/guardian within one month from the start of the semester

- Get the IV requisition letter from the Principal and mail it to the concern industry for approval

- After approval the following supporting documents are to be enclosed IV schedule

- Expense estimate(budget)

- Students name list with contact details

- Bonafide certificate from Principal in prescribed format IV Approval letter

- Faculty members (teaching and non-teaching) accompanying students for industrial visit have to claim OD and advance amount for expenses in two days prior to the departure date.

- Issuing and collecting the undertaking/declaration form signed by ward parents/guardian before one day of IV

- Submission of documents to IV coordinator.

- Awareness regarding safety and precautions will be given by the Principal to the accompanying faculty members and the same will be conveyed to the students by HOD and IV coordinator

- Before leaving for Industrial Visit, concerned faculty organizer shall arrange to procure adequate and proper FIRST AID KIT in consultation with Health Centre if necessary. The faculty members shall accompany the students throughout the IV and shall stay along with the students.

- Faculty members accompanying students for IV has to leave the report daily to Principal and respective HOD

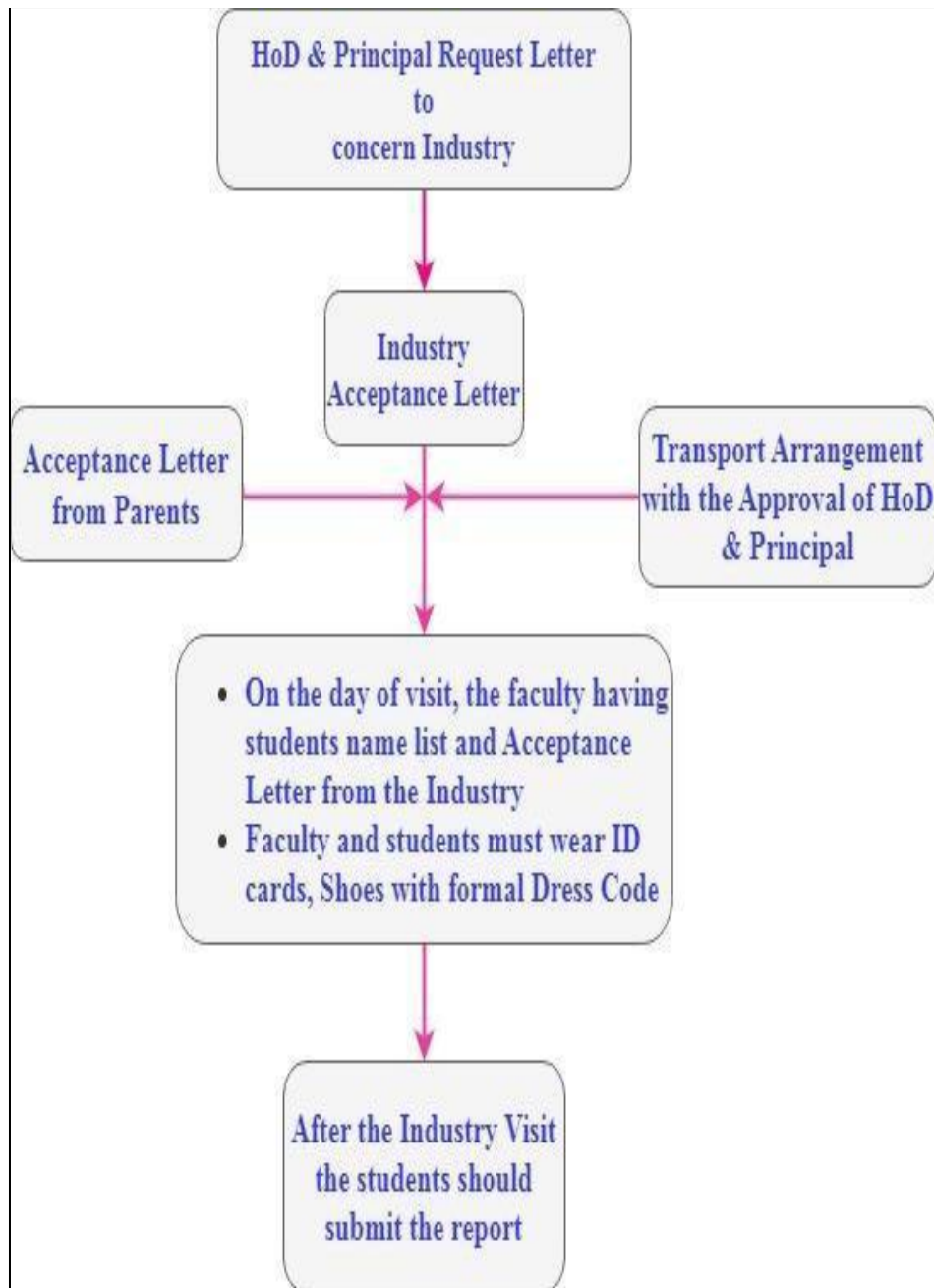The following diagram shows thatInitiatives related to industryVisit

Fig: 2.8. Initiatives related to industryVisit

List of students visited the Industry

S.NO	DATE OF VISIT	ORGANIZATION VISITED	YEAR OF STUDENTS VISITED	PROGRAM OUTCOME
		2022-2023		
1.	9-9-2022	NATIONAL SMALL INDUSTRIES CORPORATION	III	PO6,PO7,PO8,PO10
2.	9-9-2022	NATIONAL SMALL INDUSTRIES CORPORATION	IV	PO6,PO7,PO8,PO10

2021-2022				
S.NO	DATE OF VISIT	ORGANIZATION VISITED	YEAR OF STUDENTS VISITED	PROGRAM OUTCOME
1.	10/10/2021	NATIONAL SMALL INDUSTRIES CORPORATION	III	PO6,PO7,PO8,PO10
2.	25/10/2021	BSNL	II	PO6,PO7,PO8,PO10

B. Industrial /internship /summer training of more than two weeks and post training Assessment

The in plant training coordinator encourages undergoing in-plant training or internship, in their vacations. This will enable the students

To gain hands-on experience in implementing whatever they have learnt in their curriculum.

To train themselves on the state of the art equipment's and standards used by the industries.

To present themselves as complete professionals, when they go for placements.

Arranging for In-plant training / Internship

Students will choose a domain that they come across in their academia and find the industries available on that particular domain which provides training.

Students will then approach the department for getting approval.

The College will issue the necessary documents like a bonafide certificate and request letter to the concerned industry.

After the consent of the industry the students will attend the training program in the respective industries

Industry Internship students' details

Name of the Industry	No. of Days	No. of Student's Participated	Course Area	Feedback	Impact	Action	Program outcome
2021-2022							
Shiash Info Solutions Private Limited	85	06	TESTING	Get knowledge programming	Able to develop modifying existing system	To get training in programming.	PO6,PO7, PO8,PO9 &PO10
Invent {iT} Solutions	85	20	ARTIFICIAL INTELIGENCE	Get knowledge programming	Able to build statistical analysis in real life business cases	To get training in programming.	PO6,PO7, PO8,PO9 &PO10

C. Impact Analysis of Industrial Training:

- Students are exposed to real time practical experience of the subjects studied in the classrooms and realized the practical importance of the subjects.

- Industrial training inculcated more interest in the subjects

- Students are inspired to do hard work and get placed in such type of industries.

- Students were exposed to the industry standards and workplace culture, the importance of being punctual and meeting the deadlines

D. Student Feedback on Initiative

- The feedback is collected among the students about the initiatives taken by the department.

- This feedback resembles the attainment of knowledge by the student, whether it is enough or less to them.